

REMARKS

Claims 1-30 are pending in the application.

Claims 1-30 stand rejected.

Claims 3-4, 11-20 have been amended.

Rejection of Claims under 35 U.S.C. §101

Claims 11-20 stand rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. Applicants respectfully submit that amended Claims 11-20 are directed to statutory subject matter. The applicant respectfully submits that these amendments in no way change the scope of coverage of claims 3-4, 11-20.

Rejection of Claims under 35 U.S.C. §102

Claims 1-4, 8-14, 18-23 and 25-30 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Deitz, U.S. Patent No. 6,578,158 (Deitz).

The claimed invention is directed, using claim 1 as an example, to:

detecting a failure of a first virtualization device of a storage area network interconnect,
wherein said first virtualization device is associated with a unique interconnect device identifier; and
associating said unique interconnect device identifier with a second virtualization device of said storage area network interconnect in response to said detecting.

Dietz, by contrast, is directed to:

A method and apparatus for controlling a memory system 100 comprising a plurality of controllers 105 connected by a fibre channel arbitrated loop 145 to provide transparent failover and fallback mechanisms for failed controllers. The controllers 105 are adapted to transfer data between a data storage system 120 and at least one host computer 110 in response to instructions therefrom. In the method, a unique identifier is provided to each controller 105. The operation of the controllers 105 is then monitored and, when a failed controller is detected, a failover procedure is performed on a surviving controller. The failover procedure includes disabling the failed controller and instructing the surviving controller to assume the identity of the failed controller. Thus, the surviving controller is capable of responding to instructions addressed to it and instructions addressed to the failed controller, and the failure of the failed controller is transparent to the host computer 110. A computer program and a computer program product for implementing the method are also provided". (Dietz, Abstract)

The Office Action states that Dietz teaches "...detecting a failure of a first virtualization device of a storage area network interconnect ...". (Office Action, p. 3, lines 4-5) Applicants respectfully disagree that the cited portion of Dietz teaches the proffered interpretation. In fact, Applicants fail to discern how the foregoing portion (or any portion) of Dietz teaches the limitations at issue. There is not shown, taught or suggested in Dietz failure of a virtualization device of a storage area network. Applicants further respectfully submit that there is no indication of *virtualization device* in the cited sections of Dietz.

Diaz teaches a method for controlling a memory system for providing transparent failover and fallback mechanisms for *failed controllers*. Conversely, the claimed invention is directed to a method of *virtualization device failover*.

The claimed invention teaches detecting a failure of a first *virtualization device* within storage area network and associating the unique device identifier of the failed first *virtualization device* with a second *virtualization device* of the storage area network.

Dietz teaches a method adapted to *transfer data* between a data storage system and at least a host computer. On the other hand, method of the claimed invention is configured to *provide storage virtualization* to one or more application hosts. Data transferring is not analogous to providing virtual storage. Storage virtualization provides virtualization of storage services or devices for the purpose of aggregating, hiding complexity or adding new capabilities to lower level storage resources. Therefore a virtualization device is not analogous to a controller.

Dietz teaches transferring data via *controllers* adapted to transfer data between a data storage system and a host computer. On the other hand *virtualization device* of the claimed invention is configured to provide storage virtualization to one or more application hosts. Storage virtualization is the application of virtualization to storage services or devices for the purpose of aggregating, hiding complexity or adding new capabilities to lower level storage resources. The virtualization device of claim 1 is therefore in no way analogous to Dietz controller.

For example, the portion of Deitz cited as teaching:

“...

detecting a failure of a first virtualization device of a storage area network
interconnect

...”

reads as follows:

“During normal operations a fault detection step 230 is executed in which the controllers 105 exchange a series of "pings," also referred to as a heart beat signal, the response to which, as described above, signals to each controller that the other has not failed”. (Dietz 7: 35-38)

In addition, Dietz does not mention, teach, or even suggest a link is configured to transmit storage virtualization is between first virtualization device and second virtualization device

To signal failure of a controller, Deitz *controllers* exchange a series of pings. More specifically, each controller informs the other controller about failure via a heart beat signal. The heartbeat signals of the claimed invention are not exchanged between the first virtualization device and the second virtualization device. In contrast, To signal failure of a virtualization device, *monitor module* of claim 28 receives a heartbeat signal from *each virtualization device* and indicates, in response the absence of an expected heartbeat signal, a failure condition for a corresponding virtualization device to failover module. The *failover module* also of claim 28, associates the failed virtualization device’s unique interconnect device identifier with a second virtualization device, provides the failed virtualization device’s volume map to the second virtualization device, and exports all virtual storage elements associated with the second virtualization device to the storage area network.

Failure detection method of Dietz is different from the claimed invention’s failure detection method. Dietz Fault detection is executed during normal operations where the controllers exchange a series of "pings.." (Dietz 7: 35-39). In Deitz, absence of ping from

a controller denotes failure of the controller, hence until a controller fails, *both* the controllers simultaneously receive and process I/O requests from the host computers. On the contrary, data is transferred using the first visualization device of the claimed invention until the first visualization device fails. It is upon detection of an active virtualization device failure, or upon receiving a data transfer request, the unique identifier associated with the first virtualization device is associated with the second virtualization device.

In further contrast to Deitz, the claimed invention, in response to detecting a failure of first virtualization device, it is by manipulating metadata that failover manager associates the unique interconnect device identifier of first virtualization device with second virtualization device. Dietz does not mention, teach, or even suggest a link configured to transmit storage virtualization is between the first virtualization device and the second virtualization device prior to the failover.

Another distinction, the portion of Deitz cited as teaching:

“...”

wherein said first virtualization device is associated with a unique interconnect device identifier

...”

reads:

“...”

To enable the controllers 105 to be operated in dual-active mode, the controllers on host-side loops 115a, 115b, are identified by a unique identifier to permit the host computer 110 to address an I/O request to a specific controller. Deitz (5:58-60)

..."

While the claimed invention describes a unique interconnect device identifier to be a Fibre Channel world wide port name and/or world wide node name, Dietz not only fails to teach, but in no way recites the the positive claim limitation, a limitation that a unique identifier includes a World Wide Name (WWN) and a loop identifier (LOOP ID) which is assigned to each port in a host-side loop during a system initialization of the memory system.

Applicants respectfully submit that the cited sections of Deitz fail to provide disclosure of each element or limitation of Claims 1, 11, 21 and 28, and that the cited disclosure does not provide disclosure of elements that are arranged as required by the claims. For at least these reasons, Applicants submit that independent claims 1, 11, 21 and 28, and all claims depending therefrom, are in condition for allowance. Applicants therefore respectfully request the Examiner's reconsideration and withdrawal of the rejections as to these claims and an indication of the allowability of same.

Rejection of Claims under 35 U.S.C. §103

Claims 5-7, 15-17 and 24 stand rejected under 35 U.S.C. § 103(a) as purportedly being unpatentable over Deitz, U.S. Patent No. 6,578,158 (Deitz) in view of Nemoto,

U.S. Patent No. 7,124,139 (Nemoto). Applicants respectfully traverse these rejections.

Even tough Nemoto teaches a storage area network interconnect coupled to a metadata host, Nemoto fails to remedy the above mentioned infirmity of Deitz.

Nemoto teaches a computer system identifying jobs affected by a fault in any device in a storage system. When any device or mechanism fails on the data mapping path, the management server device identifies jobs affected by the fault and controls the execution of these jobs. Nemoto does not teach associating a unique interconnect device identifier to a first virtualization device, detecting a failure of a first virtualization device, and associating the unique interconnect device identifier with a second virtualization device of the storage area network interconnect in response to detecting the failure of the first virtualization device.

For the reasons presented above, neither Deitz nor Nemoto, alone or in combination, teach the noted limitations of claim independent claims 1, 11, 21 and 28.

For at least these reasons, Applicants submit that independent claims 1, 11, 21 and 28, and all claims depending therefrom, is in condition for allowance. Applicants therefore respectfully request the Examiner's reconsideration and withdrawal of the rejections as to these claims and an indication of the allowability of same.

CONCLUSION

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is invited to telephone the undersigned at 512-439-5086.

If any extensions of time under 37 C.F.R. § 1.136(a) are required in order for this submission to be considered timely, Applicant hereby petitions for such extensions. Applicant also hereby authorizes that any fees due for such extensions or any other fee associated with this submission, as specified in 37 C.F.R. § 1.16 or § 1.17, be charged to Deposit Account 502306.

Respectfully submitted,



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